

ART. VII.—*On Two New Tertiary Stylasterids.*

(With Plate XIII.)

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No members of the family *Stylasteridæ* have, I believe, been recorded as fossils in Australia, their small size having caused them to be overlooked by collectors. The specimens I have found, were obtained by washing the clays which are so characteristic of our Eocene deposits.

The arrangement of the pores in the cyclosystems of both species seems to warrant the formation of new genera for their reception; at any rate, they will not fit into any of the genera defined by Moseley.

GENUS, *Deontopora* (gen. nov.)

Dactylopores arranged in an arc of about three-quarters of a circle round a gastropore at the centre, and absent on the inner or attached edge of the cyclosystem. There are no styles visible on a superficial examination in the dactylopores, and the presence of matrix in the gastropores prevented the search for them there without mutilation of what is at present, the only specimen I have.

*D. mooraboolensis* (sp. nov.)

The cœnosteum is branched, but its general form is as yet unknown. The portion found is about 1 cm. long and 2 mm. in diameter. The surface is composed of dense calcareous tissue, and, as in *Astylus subviridis* (Moseley),\* is marked by conspicuous longitudinal rounded ridges,

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\* "On the Structure of the Stylasteridæ." Phil. Trans., 1878, p. 457.

separated by grooves. The ridges are parallel and can be traced separately for some distance. In some places, branching and anastomosing of the ridges takes place. Over the surfaces of the ampullæ the ridges are contorted very much, and their individuality is preserved for a very short distance. In the grooves between the ridges, under a strong light, narrow slit-like pits can be seen with a hand lens. Pourtales, as quoted by Moseley,\* mentions small linear pores arranged in rows and scattered over the whole cœnenchyma in *Pliobothrus symmetricus* (Pourtales). These pores, Moseley states, are occupied by canals of the cœnosarcal meshwork in the recent condition. The pits in *Deontopora* are probably the mouths of pores with the same function, as the microscope shows they have considerable depth. In two places, where smaller branches had been broken off, the cœnosteum had a cellular appearance, but this was not visible on the ends of the specimen.

The cyclosystems are arranged alternately on opposite sides of the branch, and are a little over 1 mm. in diameter. The axis of the system and that of the branch, form an angle of about 45°. The inner wall of the gastropore is confluent with the side of the branch, and the cord-like ridges mentioned above, run right down into the mouth of the pore. The dactylopores are placed on an elevated flattened, horse-shoe-shaped ridge overlooking the gastropore. Each dactylopore is situated in a broad, deep groove, at about one-third of its length from the outer end of the groove. This groove cuts the outer wall of the cyclosystem, while its inner end runs out on to the level floor pierced by the gastropore. As in *Astylus subviridis*,† the upper edge of the system slightly overhangs the outer wall, and shows marginal indentations corresponding with the centres of the outer ends of the pseudosepta, or walls between neighbouring dactylopores. The broken edges of the pseudosepta are cellular in appearance. The number of dactylopores in each system is variable, twelve or thirteen usually occurring. In one place, where a small branch is given off, a gastropore is in the axil, and four dactylopores are placed on each of the opposite sides, none being found on the sides of either the main or the secondary branch. In another case, the cyclosystem is at one side of the base of a small branch, slightly below the level of the axil, so that the position of a

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\* *Id.*, p. 440.

† Moseley, *op. cit.*, p. 457.

branch, in reference to a cyclosystem, is not quite constant. In the latter case, six dactylopores are present. In both these cases the dactylopores are rather indistinct, and the systems are possibly in process of obliteration, such obliteration being recorded by Moseley, as occurring in older portions of colonies of *Errina*.\*

The gastropore is approximately circular in outline, slightly funnel-shaped above, and cylindrical below. The presence of the matrix prevented a closer examination of its deeper parts.

The ampullæ form comparatively large hemispherical projections above the surface of the cœnosteum. Their position is not constant, though they lie near the base of a cyclosystem. Some systems have no ampulla near them, while one has two, placed one on each side of the base, though one seems the usual number. In some cases, a small aperture at the base leads through the outer wall of the ampulla, which, as a fractured portion shows, is thin. In one instance, this aperture is surrounded by a slightly projecting neck, with a thick, definite wall. The only external openings leading into ampullæ mentioned by Moseley,† occur in male colonies of *Sporadopora*, where they are small and slit-like, and are placed at the bottom of irregular depressions, which are seen with difficulty.

In *Cryptohelia* the female colony has but one ampulla associated with each cyclosystem, but in what are, perhaps, male colonies, several ampullæ occur with each.‡ In the female colonies of most of the stylasteridæ described by Moseley, there is only one planula developed in each ampulla, and the only means of escape seems to be by absorption and breaking down of the outer wall of the ampulla.§

In *Cryptohelia*, however, there are several gonophores present in each gonangium in all stages of development.|| In the latter case, a definite constant means of escape for the planulæ would seem to be necessary, though I can find no mention of this. The large size of the ampullæ in the present example of *Deontopora*, would be a strong argument in favour of the colony being a female one, and the presence of such a definite opening into the ampullæ would, I think,

\* *Op. cit.*, p. 444.

† *Op. cit.*, p. 431.

‡ *Op. cit.*, p. 463.

§ *Id.*, p. 441.

|| *Op. cit.*, p. 477.

show that it would be required frequently. Possibly then, we have in this instance a near approach to the conditions found in the gonangia of *Cryptohelia*.

When other specimens of this stylasterid are available for examination, the exact position of the genus in the group will, probably, be determinable. The suppression of some of the dactylozooids of a cyclosystem on one side of a gastrozoid, occurs at times in *Stylaster*, and is constant in *Cryptohelia*. In the latter case, however, the suppression is accompanied by the production of a calcareous lamina overhanging and protecting the cyclosystem; but it must be noted that the abortion occurs on opposite faces of the system in *Cryptohelia* and *Deontopora*. In the former, it occurs on the side of the system towards the proximal end of a branch, while in the latter, it is towards the distal end.

In *Astylus*, which is probably the nearest ally of *Cryptohelia*, the homologue of the external lid of the latter is a small tongue-like projection placed somewhat deeply in the gastropore, and dividing it into an inner and an outer chamber.\* Sections would, of course, require to be rubbed down to settle whether or not such a process is found in *Deontopora*, or whether, on the other hand, a style is developed. In the former case its nearest ally would be *Astylus*, and in the latter *Stylaster*. If neither style nor process occur, its affinities would be with *Conopora*.† The external characters point, I think, to an alliance with *Astylus* and *Cryptohelia*.

*Locality*.—Grey clays, Orphanage Reserve, Eyaunsford, Geelong. Only one specimen found.

#### GENUS *Leptobothrus* (gen. nov.)

The pores are grouped in cyclosystems; dactylopores not in radial grooves.

The absence of grooves containing the dactylopores is a feature not apparently occurring in any genera in which cyclosystems are found, though it occurs in *Sporadopora* and *Distichopora*.

#### *L. spenceri* (sp. nov.)

The specimen figured consists of a portion of a branch which is circular in section. Length 5 mm., diameter 1 mm.

\* Moseley, *op. cit.*, p. 458.

† *Id.*, p. 503.

The regularity of its form is disturbed by cyclosystems, which are scattered irregularly over its surface. The surface is marked by minute pores, which are slit-like, oval, or circular. They are larger and more distinct than the corresponding pores of *Deontopora*, and are irregularly scattered.

The cyclosystems appear as cylindrical elevations at right angles to the axis of the branch, and irregular in position. The gastropores have well defined walls of similar texture to the surface of the branch. They are cylindrical in shape, and maintain the same diameter right to the top of the cyclosystem, not as in most other genera, opening into a basin-shaped depression. The dactylopores are about eight or nine in number, and open directly on the surface of the ring which forms the boundary of the gastropore, not being placed in radial grooves. The apertures are about midway between the inner and the outer walls. No styles were seen in either kind of pore.

The ampullæ are not noticeable externally, but a large distinct pore, with a slightly expanded external opening, is present at a small distance below the cyclosystem in nearly every instance. In *Cryptohelia*,\* the ampullæ are always developed in connection with the cyclosystems, and the invariable presence of a pore in this position in the present specimen, renders it probable that it leads into an ampulla. One or two pores which, though somewhat smaller, have a similar appearance, are placed without relation to any cyclosystem. Named as a compliment to Professor W. Baldwin Spencer.

*Localities.*—A well-sinking in the Eocene beds at Belmont, near Geelong, and at Schnapper Point.

My thanks are due to Professor Spencer for suggestions, and for the loan of works, without which this paper could not have been prepared.

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\* Moseley, *op. cit.*, p. 477.

DESCRIPTION OF PLATE.

FIG. 1.—*Deontopora mooraboolensis*, enlarged.

FIG. 2.—Two ampullæ seen somewhat from below.

*a.*—Broken end of a small branch showing cellular appearance, due to the cut ends of the cœnosarcal tubes.

*b. b.*—Ampullæ, the one on the left being broken.

*c.*—Pore of ampulla, with definite ring-like wall.

*d. d.*—Slit-like pores in grooves on surface of cœnosteum.

*e.*—Pore of ampulla, its wall being broken.

The part shown in this Figure is seen from above in the lower left-hand corner of Fig. 1.

FIG. 3.—Diagram of cyclosystem of *Deontopora*.

*Gp.*—Gastropore.

*Dp.*—Dactylopore in groove.

*Ps. Ps.*—Pseudosepta.

FIG. 4.—*Leptobothrus spenceri*, enlarged.

FIG. 5.—Diagram of cyclosystem of the same.

*Gp.*—Gastropore.

*Dp.*—Dactylopore.

Fig 1.

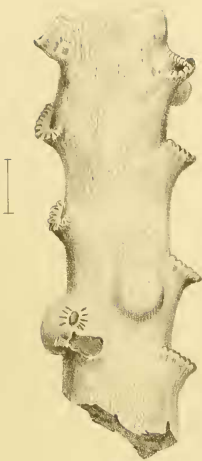


Fig 2.

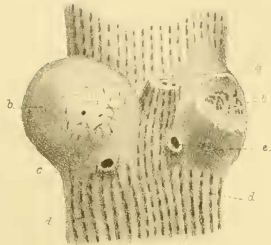


Fig 3.



Fig 5.

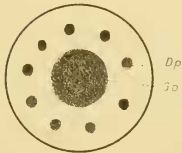


Fig 4.

